REMARKS

The claims have been amended by rewriting claim 1. Claims 1- 53 remain in the application.

Reconsideration of this application is respectfully requested.

Claim Rejections - 35 U.S.C. § 102(e):

Claims 1-28, 48-53 stand rejected under 35 U.S.C. § 102(e) as being clearly anticipated by Lim (U.S. 6,292,141).

Applicants amend in part and traverse in part.

Applicants respectfully traverse the rejection of claim 1 but have also amended claim 1 to more clearly recite the broad bandwidth aspect of the invention. Applicants claim in amended independent claim 1

a dielectric resonator antenna dimensioned to support:

a first mode characterized by a first center frequency and a first bandwidth; and

a second mode characterized by a second center frequency and a second bandwidth; wherein

the first bandwidth is at least about one-half of a difference between the first center frequency and the second center frequency thereby providing a continuous broad bandwidth to the dielectric resonator antenna.

Support for this amendment is found in Applicants' Specification on page 15, lines 11-29 and FIGs. 7 and 8. For the rejection of claim 1, the Examiner refers to dielectric resonator antenna 402 of FIG. 4, an S-band mode and an L-band mode. Applicants respectfully point out that there is no discussion of S-band operation with FIG. 4. There is, however, a discussion of S-band operation in Lim column 7, lines 30-32 in conjunction with FIG. 2A where an L-band antenna 204 operates solely as a transmit antenna while antenna 208 is an S-band antenna operating solely as a receive antenna. Also in column 7, lines 66-67 through col. 8, lines 1-2 Lim describes an S-and antenna 224 and an L-band antenna 228 in a vertical stacking but still operating separately as transmit and receive antennas. In FIG. 2C and col. 8, lines 20-23, upper resonator 232 operates on the S-band while lower resonator 240 operates on the L-band. Further discussion of S-band operation also occurs at column 11, lines 3-5 in conjunction with FIG. 6

and the graphs of FIGs. 7 and 8 associated therewith. Graphs 7 and 8 and column 11, lines 30-35 indicate that the bands associated with Lim are different with two different resonant frequencies, one for the patch 604 and one for the dielectric resonator 240. Thus, Lim fails to teach a continuous broad bandwidth with any of his structures.

To be anticipated under 102(e) requires that the reference teach each and every element of the claim. Lim fails to teach a dielectric resonator in which the first bandwidth is at least about one-half of a difference between the first center frequency and the second center frequency. Furthermore, claim 1 as amended includes the language "thereby providing a continuous broad bandwidth" to more clearly identify that the bands of operation are not separated out. Accordingly, the rejection of claim 1 is believed to be overcome.

Additionally, Applicants take issue with the embodiments pertaining to FIGs. 4 and 5 of Lim. Column 10, lines 10-14 and FIG. 4 of Lim teach a conductive patch 404 disposed on a ground plane 406. Applicants point out that this equates to metal on metal and basically shorts itself out. Typically, a patch antenna should be separated from the ground plane with some type of substrate therebetween. In FIG. 5 of the reference, designator 408 does not align with designator 408 of FIG. 4. Designator 408 is supposed to be a substrate in FIG. 4 but in FIG. 5 designator 408 looks like a probe. Applicants are not sure if this was numbered incorrectly and should have been perhaps been labeled as designator 410? Even if the structure taught in FIGs. 4 and 5 could work, they do not teach or suggest that which is claimed by Applicants' invention.

Applicants respectfully traverse the rejection of independent claim 5 asserting that the reference to column 4, lines 7-12 of Lim is inappropriate. This section of the Lim reference pertains to material properties (the dielectric constant $\acute{\varepsilon}_r$) whereas claim 5 of Applicants' invention specifically claims and identifies lambda (λ) as a free space wavelength. These are two completely different parameters. Accordingly, the rejection of claim 5 is overcome.

Applicants respectfully traverse the rejection of independent claims 21 and 48. In each of these independent claims, Applicants specifically claim "a microstrip". The Lim reference fails to teach or suggest a microstrip. Applicants respectfully point out that element 410, referred to by the Examiner, is not a microstrip. None of the drawings in Lim teach or suggest a microstrip. Element 410 of FIG. 4 is pointing to a shield portion of a coaxial cable and is identified as a feed

probe 410 in column 10, lines 46-48 of Lim. The only time the word microstrip is ever used in the Lim reference is in col. 8, lines 49-54 where Lim states that dielectric resonator antennas are easier to manufacture than microstrip patch antennas. Accordingly, the rejection of claims 21 and 48 is overcome.

Moving to claim 51, Applicants again traverse the rejection as Lim fails to teach a wireless telephone structure that includes a dielectric resonator antenna. Lim only suggests, in col. 8, lines 35-39, that the Lim dielectric antenna is suitable for use in satellite phones. Lim fails to teach any structure including elements as claimed by Applicants' claim 51. Even if Lim's dielectric resonator antenna were placed in a telephone, Applicants have serious doubts as to whether it would work based on the arguments presented above regarding the discrepancies of FIGs. 4 and 5. Accordingly, the rejection of claim 51 is overcome.

The Lim reference teaches (Abstract) that a dual band antenna can be constructed by positioning and connecting two dielectric resonator antennas together. Each resonator in the dual band configuration resonates at a particular frequency, thereby providing dual band operation. The resonators can be positioned side by side or vertically. Lim does not anticipate using a single dielectric resonator to obtain wideband operation or multiband operation. Lim requires the use of two antennas in all embodiments except for the embodiments of FIG. 1A and FIG. 4. In FIG. 1A Lim only provides a single band antenna. In FIG. 4, Lim uses a dielectric resonator and a conductive patch as opposed to a single dielectric resonator. Applicants' invention, on the other hand, uses a single dielectric resonator to excite different modes at different frequencies.

Accordingly, the rejection of independent claims 1 (as amended), 5, 21, 29, 48, and 51 are believed to be overcome. The dependent claims provide further limitations to what are believed to be allowable claims and hence are also in condition for allowance.

Claim 29 stands rejected under 35 U.S.C. § 102(e) as being clearly anticipated by Heinrichs et al. (U.S. 6,323,824).

The Heinrichs reference fails to teach a parasitic element. Element 6 of Heinrichs is identified as a second metallic layer attached at solder point 7 as described in col. 3, lines 46-48. The conducting strip 6 is connected to the electrical contact as claimed in claim 2. Thus, element

6 operates as an exciter that is physically connected. Parasitic elements, as known in the art, are not physically attached. Accordingly, the rejection of claim 29 is overcome.

Allowable Subject Matter:

Claims 30-39 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form, including all other limitations of the base claim and any intervening claims.

Applicants thank the Examiner for the indication of allowable subject matter but believe that the arguments presented above overcome the rejection.

Allowable Claims:

Claims 40-47 are allowable over the prior art of record.

Applicants thank the Examiner for the allowance of claims 40-47.

Accordingly, this application is believed to be in proper form for allowance and an early notice of allowance is respectfully requested.

Please charge any fees associated herewith, including extension of time fees, to 50-2117.

Respectfully submitted,

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